

IN THE CLAIMS:

Please cancel Claims 16-23 without prejudice or disclaimer of the subject matter recited therein.

Please add new Claim 24 as follows.

Claims 1-23. (Cancelled).

24. (New) A method of manufacturing a MOS-type solid-state image pickup device comprising:

a photoelectric conversion unit having a first semiconductor region of a first conductivity type, a second semiconductor region of a second conductivity type forming a pn-junction between the first and second semiconductor regions, and a third semiconductor region of the first conductivity type disposed in contact with the second semiconductor region at a light incident side of the second semiconductor region;

a transfer MOS transistor having a fourth semiconductor region of the second conductivity type disposed in contact with the first semiconductor region, and a gate electrode disposed on an insulating film on the first semiconductor region between the photoelectric conversion unit and the fourth semiconductor region to transfer a charge carrier from the second semiconductor region to the fourth semiconductor region;

a fifth semiconductor region of the second conductivity type arranged continuously to the second semiconductor region under the gate electrode; and

a semiconductor substrate of the second conductivity type on which the photoelectric conversion unit and the transfer MOS transistor are disposed, wherein the method comprising:

a first step of forming the second semiconductor region by ion implanting an impurity of the second conductivity type at a first angle with a first energy using the gate electrode as a mask;

a second step of forming the fifth semiconductor region by ion implanting an impurity of the second conductivity type at a second angle with a second energy using the gate electrode as a mask; and

a third step of forming the fourth semiconductor region by ion implanting an impurity of the second conductivity type, wherein

the second energy is smaller than the first energy, the first and second angles are respectively angles to a direction normal to a surface of the semiconductor substrate, the second angle is larger than the first angle, and the first and third steps are performed separately.